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## ENVIRONMENTALLY FRIENDLY UMKM, DRIVER FOR IMPLEMENTATION GREEN MANAGEMENT

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### ABSTRACT

Planet earth is currently faced with various environmental problems that are worrisome and threaten business sustainability. The manufacturing sector needs to take better and more consistent responsibility in mitigating this problem. Not only large industries, but also small industries that are widely cultivated such as MSMEs. The application of green management (GM) is an alternative to embrace sustainability. GM can use a variety of techniques that have an impact on reducing waste and environmental pollution. However, MSMEs face obstacles based on management functions, professionalism, and knowledge in implementing GM practices. The purpose of this research is to understand the main drivers for MSME Industry, in implementing Green Management in Banda Aceh City. The perception data of 60 MSME actors taken randomly was used in this study. The ranking of driving factors uses the Fuzzy TOPSIS method which is one of the Multi Criteria Decision Making (MCDM) methods. This study found that the five main drivers of GM implementation are increasing competitiveness (driver 1), incentives provided by the government (driver 2), law enforcement (driver 3), commitment from top management (driver 4), product distribution (driver 5). Employee awareness/motivation, customer demand, pressure from local community, environmental knowledge/technology, raw material sourcing, cost savings, financial resources, efficiency and pressure from business trade associations.

**KEYWORDS:** Green Management, MSMEs, Drivers, Industry, Fuzzy TOPSIS

### INTRODUCTION

Micro, small and medium enterprises (MSMEs), including those categorized into the manufacturing industry, are an important and strategic sector, because of their very close relationship with other sectors

such as trade, forestry, fisheries, and finance. This fact shows the large role of MSMEs in economic development. The government also hopes that MSMEs can play a role in building the national economy, including business development based on regional and market potential (Wijoyo, 2021). MSMEs have several potential strengths which are the mainstays that form the basis for future development such as providing employment, entrepreneurial resources, having unique market business segments, utilizing surrounding natural resources, and having the potential to develop (Ramdhansyah & Silalahi, 2013). Is a business group that has the largest number and is proven to be resistant to various kinds of economic crises (Tambunan, 2012). To assist the development of MSMEs, the Government of Aceh has organized various training activities in the fields of management and production. However, the development of MSMEs to play a greater role in reducing environmental damage is still not optimal. Whereas (Seth, Rehman, & Shrivastava, 2018) (Choi & Chiu, 2012) stated that environmental pollution is inherent in the manufacturing and distribution process.

The application of green management (GM) is an alternative for the manufacturing industry to embrace sustainability. GM can use various techniques that have an impact on reducing waste and environmental pollution (Dilip Maruthi & Rashmi, 2015), and promoting a more sustainable economic climate (Ayandibu & Akbar, 2021). Regulatory pressures will continue to become more stringent and therefore, MSMEs in the manufacturing industry must take a strategic and enlightened point of view. That the application of GM in the industry is not only to comply with regulations, but also to achieve better financial returns (Seth et al., 2018a).

Green management is understood as a combination of actions, initiatives and techniques that positively affect environmental, social or economic performance. GM reflects a manufacturing paradigm that combines goals, motivators, critical success factors, technology and innovation to become more environmentally friendly. GM includes creating or creating products/systems that consume less raw materials, less energy, replace toxic inputs with non-toxic, renewable materials replace non-renewable materials, reduce unwanted waste, and use recycled materials (Dilip Maruthi & Rashmi, 2015).

However, MSMEs, which involve many business actors, face various obstacles based on the concentration of management functions, lack of professionalism, and inadequate understanding of the intricacies of environmental management practices. In this condition, MSMEs need to be motivated and need assistance in the form of approaches and frameworks to improve their environmental performance. An understanding of the main drivers for GM adoption in manufacturing MSMEs is very important, in order to avoid misguided policy-making by stakeholders. This study seeks to find factors that can encourage MSMEs to implement environmentally friendly management in running their businesses, especially in the city of Banda Aceh.

## RESEARCH METHODS

A driver is a practice or factor that is focused on encouraging and ensuring the success of a concept. The driving factor that can influence the industry towards environmental improvement is obtained from the condition of the industry itself in the form of regulations. education. knowledge. commitment. and industrial performance improvements that can be achieved from environmental improvements. This study has identified the drivers of green management implementation that have been published in several literatures, and become an alternative in MSME decision making, as shown in Figure 1. The drivers for being environmentally friendly can come from internal and external companies. External factors include the government (Mittal & Sangwan, 2015) (Seth, Rehman, & Shrivastava, 2018b), pressure from the community (Luken & Van Rompaey, 2008), customers and supply chain partners (Faridi & Malik, 2019), can influence various environmental management techniques within an organization. Internal factors such as resource management (Agi & Nishant, 2017), also affect the readiness of industrial MSMEs to implement GM.



**Figure 1. Hierarchical structure for ranking the drivers of GM implementation in MSMEs.**

Banda Aceh City has 208 MSMEs in the processing industry (data from the Banda Aceh City Cooperative and MSME Service) as shown in Table 3.1 The sample was selected randomly and proportionally according to the sub-districts in Bada Aceh City. Each of the selected samples was 29% of the population, namely as many as 60 industrial MSMEs. Each selected MSME will be interviewed by 1 person from the

leadership or business owner as a respondent. The questionnaire consists of three parts; the first part contains the respondent's business identity, and the second part contains questions about alternative driving factors identified from the results of the literature study, the number of core questions in the questionnaire is 14 questions, and the third part contains questions about decision criteria based on the respondent's perspective which contains one question, namely priority. for natural, social and economic perspectives.

The measurement of respondents' perceptions in this study uses a fuzzy set with a scale of 1-9 (Zadeh, 1965), as linguistic terminology for alternatives and criteria, which describe the degree of membership. The role of the degree of membership as a determinant of the existence of elements in a set is very important. Membership value or membership function is the main characteristic of reasoning with fuzzy logic (Sri, Sri, Agus, & Retantyo, 2016). The linguistic terminology "not important" is represented by fuzzy set members (1,1,3), "less important" is represented by fuzzy sets (1,3,5), "quite important" members of the set (3,5,7), for the criteria "important" is given a member of the set (5,7,9), and "very important" is represented by a member of the set (7,9,9).

The ranking process of alternative drivers using fuzzy TOPSIS. This concept is based on the concept that the best-chosen alternative not only has the shortest distance from the positive ideal solution, but also has the longest distance from the negative ideal solution (Hwang, 1981). This concept is widely used in several MCDM (Multi criteria decision making) models to solve practical decision problems.

The ranking process using the fuzzy topsis method goes through the following stages: (Mittal & Sangwan, 2015)

*a. Determine the aggregated fuzzy decision matrix for the criteria*

This study uses three decision-making criteria, namely MSME actors who have a dominant perspective from one perspective of the natural environment, social environment and economy (C1, C2, C3). evaluated against fourteen alternatives, namely  $D_j = \{D1, D2, ..., D14\}$ . The weight of the criteria is denoted by  $(w1, w2, w3)$ . The performance rating of each decision maker  $D_{kj}$  ( $k = 1, 2, 3$ ) for each alternative  $D_j$  ( $j = 1, 2, ..., 14$ ) with respect to the criteria  $C_i$  ( $i = 1, 2, 3$ ). Aggregate fuzzy matrices for criteria are denoted by  $R_{ki} = (a, b, c)$ ;  $k = 1, 2, 3$  where

$$a = \min_k \{a_k\} \quad b = \frac{1}{3} \sum_{k=1}^3 b_k \quad c = \max_k \{c_k\}$$

*b. Determine the fuzzy decision matrix for alternatives*

The fuzzy decision matrix for alternative D is constructed using the following relationship:  $D = [R_{kij}]$   
; ( $k=1,2,3$ ;  $i=1,2,3$ ;  $j=1,2,... 14$ )

c. *Normalize the fuzzy decision matrix for alternatives*

The decision normalization matrix (R) was performed to bring the various criteria scales on a comparable scale.  $R = [r_{ij}]_{3 \times 14}$   $i=1,2,3$  dan  $j=1,2,...,14$  Where  $r_{ij} = \left( \frac{a_{ij}}{c_{ij}^*}, \frac{b_{ij}}{c_{ij}^*}, \frac{c_{ij}}{c_{ij}^*} \right)$  and  $c_{ij}^* = \max(c_{ij})$  favorable or important criteria

d. *Determine the weighted normalization matrix for alternatives*

The weighted normalization matrix V for the alternatives is calculated by multiplying the weight  $w_j$  of the aggregate fuzzy matrix for the criteria with the normalized fuzzy decision matrix. *Menentukan solusi ideal fuzzy positif (FPIS) dan solusi ideal negatif fuzzy (FNIS)*

FPIS is the maximum value of the weighted normalization matrix for each criterion

$D^+ = (v_1^+, v_2^+, v_3^+)$ , dimana  $v_j^+ = \max(v_{ij})$ ;  $i=1,2,3$  dan  $j=1,2,...,14$  dan FNIS is the lowest value of the weighted normalization matrix for each criterion

$D^- = (v_1^-, v_2^-, v_3^-)$ , dimana  $v_j^- = \min(v_{ij})$ ;  $i=1,2,3$  dan  $j=1,2,...,14$

e. *Calculate the distance from each alternative of FPIS dan FNIS*

Calculated using the equation of the distance of two fuzzy triangle numbers. If  $D^+ = (a_1, a_2, a_3)$  and  $b = (b_1, b_2, b_3)$  are weighted alternative numbers, then the distance between them is given

$$dv(a, b) = \sqrt{\frac{1}{3} [(a_1 - b_1)^2 + (a_2 - b_2)^2 + (a_3 - b_3)^2]}$$

$$d_i^+ = \sum_{j=1}^3 d_v(d_{ij}, d_j^+) \text{ dan } d_i^- = \sum_{j=1}^3 d_v(d_{ij}, d_j^-)$$

f. *Calculating the proximity coefficient (CCi) of each alternative*

The proximity coefficient of each alternative is calculated using the equation

$$CC_i = \frac{d_i^-}{d_i^- + d_i^+}; i = 1, 2, \dots, 14$$

g. *Ranking*

The total score of CCi with the largest value is the first rank, and so on until the smallest.

After getting the results from the questionnaire, the researchers used the fuzzy method to process the data and get the results of the Agregat proximity coefficient of each alternative as below.

## RESULT AND DISCUSSION

The drivers for GM implementation in industrial MSMEs were identified, analyzed, and ranked using the Fuzzy TOPSIS technique. MSME actors as decision makers have been asked about their perceptions of the three criteria perspectives, namely the natural environment, social environment and economic benefits

which are asked in the questionnaire. The results show that there are 38 percent of MSMEs that give the main focus on the preservation and cleanliness of the natural environment in running their business, 35 percent who think that the social environment should be given more attention, and 27 percent who are very focused on economic benefits in operating their businesses. The calculation of the aggregate fuzzy rating decision matrix is given in table 1 below

**Table 1. Aggregated fuzzy decision matrix for criteria**

<b>Matrix</b>	<b>nature perspective</b>	<b>Social perspective</b>	<b>economic perspective</b>	<b>Fuzzy aggregate weight</b>
DM1 (nature)	(7,9,9)	(3, 6.10, 9)	(3, 5.89, 9)	3, 6.99, 9
DM2 (social)	(3, 5.91,9)	(7,9,9)	(3, 5.89, 9)	3, 6.93, 9
DM3 (economic)	(3, 5.95, 9)	(3, 6.05, 9)	(7,9,9)	3,7,9

The following is an explanation for the criteria, namely the three perspectives in making decisions, in this study, namely:

1. Natural Environment Perspective (DM1) : Decision making 1 is SMEs that give first priority to the natural environment in running their business (based on the answers to the questionnaire).
2. Social Environment Perspective (DM2): Decision making 2 is the MSME actors who give the first priority to maintaining the social environment in running their business (based on the answers to the questionnaire). Activities in obtaining profits through the production process, and other activities while still paying attention to the preservation of the social environment.
3. Economic Perspective (DM3): Decision making 3 is an MSME that gives first priority to economic benefits in running a business (based on the answers to the questionnaire). In this case, MSMEs carry out their activities focusing on economic benefits, and pay less attention to the social and environmental problems that arise.

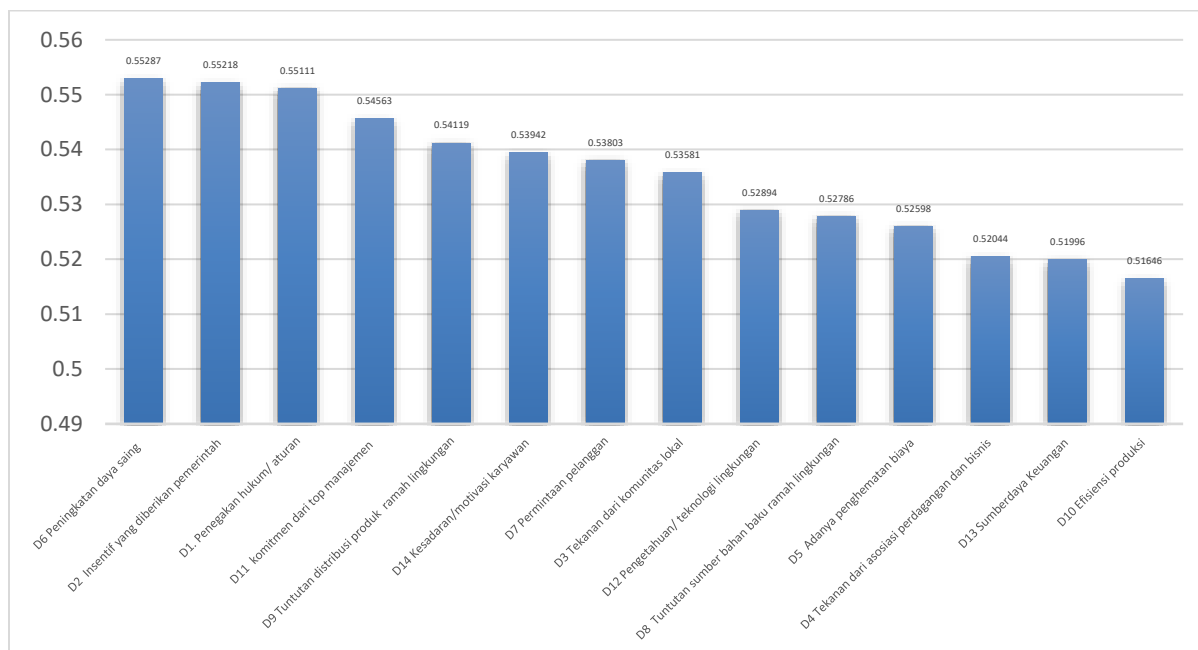
Furthermore, the results of the calculation of the fuzzy decision matrix that have been carried out by the weighted normalization process for the alternatives are given in the following table.



**Table 2 Weighted Normalization Matrix of Fuzzy keputusan Decision Matrix**

Driver			
	nature	social	economic
D1: Law enforcement/rules	(1.67,5.97,9)	(1.67, 5.95, 9)	(0.33, 5.52, 9)
D2: Incentives provided by the government	(0.33, 5.44,9)	(1.67, 5.81, 9)	(1.67, 6.33, 9)
D3: Pressure from local community	(0.33, 5.70, 9)	(1.67, 5.95, 9)	(0.33, 5.44, 9)
D4: Pressure from trade and business associations	(0.33, 5.38, 9)	(1.00, 5.53, 9)	(0.33, 5.00, 9)
D5: There are cost savings	(0.33, 5.44, 9)	(1.00, 5.53, 9)	(0.33, 5.67, 9)
D6: Increasing competitiveness	(1.67, 6.08, 9)	(0.33,5.53,9)	(1.00, 5.97, 9)
D7: Customer request	(1.00, 5.86, 9)	(1.00,5.67,9)	(0.33,5.30,9)
D8: Demand for environmentally friendly raw material sources	(0.33, 5.92, 9)	(1.67,5.94,9)	(0.33,5.37,9)
D9: Demand for distribution of environmentally friendly products	(1.00, 5.70, 9)	(1.00,5.25,9)	(0.33, 5.37, 9)
D10: Production efficiency	(0.33, 5.00, 9)	(1.67,6.37,9)	(0.33, 5.15, 9)
D11: commitment from top management	(0.33, 6.13, 9)	(1.00,5.67,9)	(0.33, 5.89, 9)
D12: Environmental knowledge/technology	(0.33, 5.55, 9)	(1.00,5.11,9)	(0.33, 5.81, 9)
D13: Financial Resources	(0.33, 5.38, 9)	(0.33,5.46,9)	(0.33, 5.37, 9)
D14: Employee awareness/motivation	(0.33, 5.68, 9)	(1.67,6.37,9)	(0.33, 5.67, 9)

Next, calculate the distance from each alternative from FPIS and FNIS and determine the proximity coefficient (CCi) of each alternative to obtain the ranking of each decision alternative, as presented in Figure 2 below.



**Figure 2. Results of the Aggregate Proximity Coefficient**

Based on the results of data processing in the aggregate, the five most important drivers for the application of green management to industrial MSMEs in Banda Aceh City are “increasing competitiveness” (driver 1). The implementation of GM can result in cost savings in the long term, through saving energy, water, raw materials that are not wasted, so that they can be competitive in pricing. In line with (Luken & Van Rompaey, 2008) that, achieving or maintaining competitiveness often means reducing operating costs. Product competitiveness is an important consideration in adopting GM (Hasan, Murni, Junita, & Rahmi, 2021). Build a better product image or green product image, add value to consumers and help achieve better competitiveness. In fact, businesses need to be embedded in technology in order to be competitive, and become a customer-centric organization.

The next driver is “government-provided incentives” (driver 2). GM adoption requires relatively high initial capital. While it is commonly understood that MSMEs face a budget dilemma, how can they utilize technology with limited resources and capacities. Incentives in terms of loans, grants, tax breaks, mentoring and other economic benefits can facilitate the adoption of GM in MSMEs, this is in line with (Mittal & Sangwan, 2015). The next driver for successful GM implementation is “law enforcement/rules” (driver 3) enforcement of regulations and policies regarding pollution control, such as reducing air pollution with ash, exhaust emissions, water pollution, noise can force MSMEs to start the GM implementation process. Reports from previous studies that put “regulatory pressure” as the main drivers



include (Ramdhansyah & Silalahi, 2013) (Di, Agriculture, & Payakumbuh, 2018) (Cuerva, Triguero-Cano, & Córcoles, 2014). the main driver for involving MSMEs in environmental management initiatives. Currently, for various reasons, MSMEs seem to have been left out of regulatory pressure regarding the environmental and social impacts of their activities, but now is the time to realize that ignoring the environmental impacts of MSMEs is no longer feasible. The reason behind this could be because in developing countries there is a lack of awareness and understanding of consumers about the importance of environmentally friendly products and processes.

Commitment from top management is another critical driver (driver 4), the driver of top management commitment is a critical driver in the successful implementation of GM practices. This is very important, due to the fact that in MSMEs, the entrepreneur is also the owner acting at the top management level. They have a prominent influence in the decision-making process (Ramadani & Syariati, 2020), therefore a strong positive approach from top management is very important to drive the process of implementing GM strategies (Junita, Asmawati, & Najmi, 2019). Another important driver is “the demand for environmentally friendly product distribution” (driver 5). Community demands for green distribution need to involve monitoring actions on distribution channels related to environmental performance. Timely and efficient delivery, emission reduction is the most critical criteria for greenness. This requires that the distribution performance of the product need to be considered, including packaging that is environmentally friendly, free from hazardous materials for health, easily decomposes when turned into waste, or product packaging that can be reused, or recycled. Tactical efforts can be made by working with channel partners to develop product packaging reuse or disposal arrangements.

The success of GM implementation in MSMEs is also driven by other drivers apart from the five main drivers, such as “employee awareness or motivation” (driver 6). Employees who are motivated to always be environmentally friendly are an important asset for the successful implementation of GM. Because employees are the executor of the success of management policies. The “customer demand” factor (driver 7), the essence of marketing is to serve customer demands and make them satisfied. Consumers who have awareness of healthy and environmentally friendly products will look for products with these criteria, even though they have to pay a premium price. MSMEs need to take advantage of this market segment. Another driver is “pressure from local communities” (driver 8), MSMEs need to pay attention to their operating environment, not littering that causes environmental pollution, both water and air. Environmental pollution leads to demands from local communities, which can threaten the sustainability of the company. The next driver is “knowledge and mastery of environmentally friendly technologies” (driver 9), mastered technology can produce innovation. In the context of green management, innovation can occur in the production process or in the products produced. Data on MSMEs in Banda Aceh City show that most of them are engaged in the beverage and food industry, where it is easier for this sector to innovate in the

production process (Luken & Van Rompaey, 2008). Another factor is “the demand for environmentally friendly raw material sources” (driver 10), the raw materials used are an important factor in producing green products. This involves environmentally friendly suppliers, the selection of reliable suppliers needs to be a concern.

From a natural perspective, competitiveness is the first driver, from a social perspective it is the fifth driver and from an economic perspective it is the second driver, but it is still included in the five main drivers. Law enforcement is the second important driver from both a natural and social perspective, but being the eighth driver from an economic perspective, the second driver is customer demand. Economically, customers are the focus of business activities. Customer demand is the 3rd important driver from a natural perspective and the ninth driver from the social side.

## CONCLUSION

The government is an important driver to build environmentally friendly MSMEs. Its role can be realized through the provision of incentives and law enforcement. Community communities and environmental associations or organizations are also important drivers that can "force" MSMEs to be environmentally friendly. This role is realized through demands for environmentally friendly supply chains, namely environmentally friendly distribution, environmentally friendly raw materials and environmentally friendly processes. The implementation of GM in MSMEs is also driven by the commitment of top management. This commitment can be driven by the benefits resulting from the implementation of GM itself, which can increase product competitiveness. Products become more competitive in terms of price and product image. Access to green technology by MSMEs and employee awareness are other important drivers for GM implementation and innovation.

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